

# Behavioural Science and Environmental Behaviour

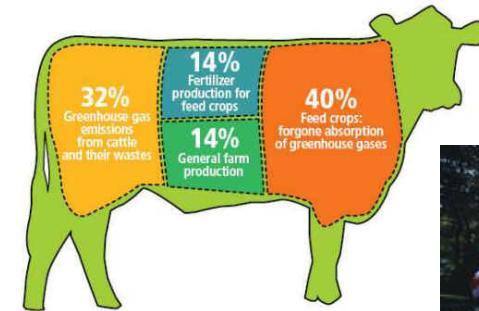
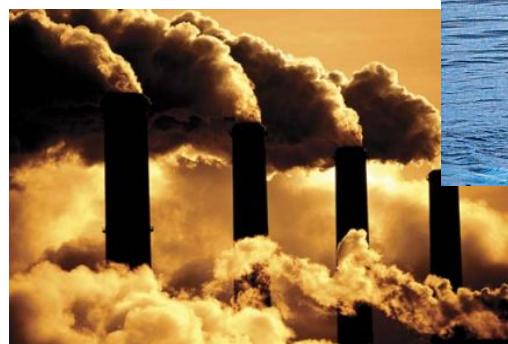
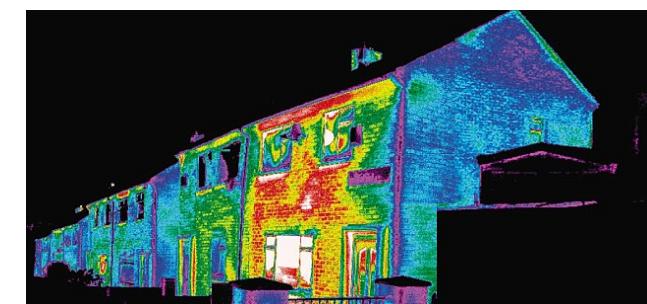
# Today

1. Is Behavioural Science needed?
2. Behavioural Concepts and the Environment
3. Behavioural Policies and the Environment

# 1. Is Behavioural Science needed?

# Environmental challenges

- Carbon emissions & climate change
- Resource depletion
- Biodiversity loss
- Energy sources (oil versus nuclear, renewables)
- Water and food security

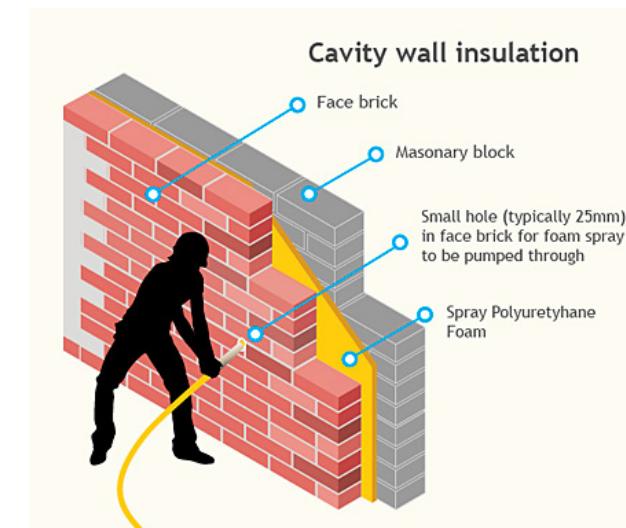
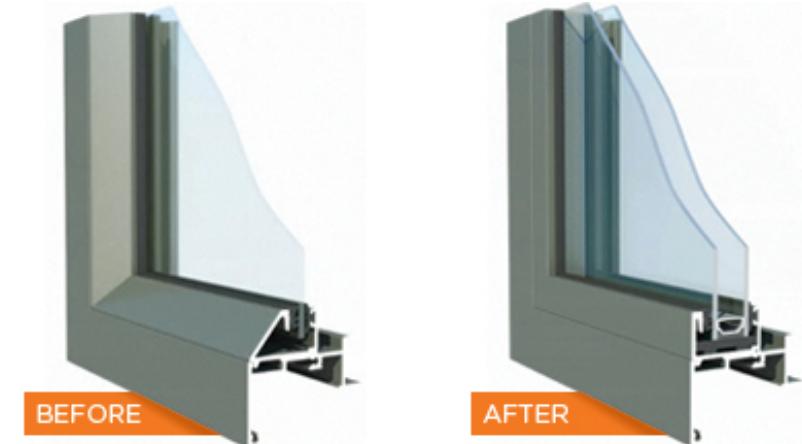


# Can we change it?

- So behaviour is important, but can we change it?
  - Depends on the impact of the behaviour.
  - How many people perform it.
  - Scope for change or *plasticity*.

# Some opportunities for change

- Purchasing efficient light bulbs
- Purchasing efficient appliances
- Adjusting thermostat/heating levels
- Investing in insulation
- Switching transport modes
- Changing diet
- Reducing littering and illegal dumping
- Recycling
- ...



# Do people want to be sustainable?

- Yes: Many people report being concerned about the environment, like the idea of sustainable behaviour, and are worried about climate change (Gifford, 2011).

# Do people act sustainably?

- No: We still produce huge volumes of greenhouse gases & engage in environmentally destructive behaviour.

= The Intention-Behaviour Gap

# Intention-behaviour gap

- Stated preferences ≠ revealed preference (e.g., Bamberg & Möser, 2007; Nigbur et al., 2010)
- This insight is key to developing effective pro-environmental policies – changing intentions is not enough!
- Attempts to enhance pro-environmental behaviour and to capitalise on favourable consumer attitudes often met with limited success. Good behavioural science is needed.

# The “Energy Paradox”

- Win-Win Situation: Energy efficiency saves money and saves the environment.”
- But: consumers do not purchase energy-efficient products that are in their economic interest due to short-term costs (Allcott & Greenstone, 2012)

# Global Warming



- “If you had to design a problem people don’t care about, it would be global warming.” (Dan Ariely)
  - Slow and far away in future
  - Distant, other people far away affected first
  - Unrelated to the present welfare of ourselves and our significant others.
  - Anything we do is a drop in the bucket.
  - No identifiable victim, global warming does not tap our emotions.

# Barriers to change

- Structural barriers:
  - Low income, high prices, low temperature, transport infrastructure, recycling facilities...  
→ Could be removed by legislation.
- Psychological barriers:
  - Overcoming these needs behavioural insights.
  - Gifford (2011) presents a “preliminary taxonomy” of psychological barriers.
  - He calls the psychological barriers "*The Dragons of Inaction*"

# “The Dragons of Inaction” (Gifford, 2011)



“I use dragons as a metaphor for these obstacles because no matter what their form or shape, Western dragons always seem to be blocking humans from some goal or aspiration.”

# “The Dragons of Inaction” (Gifford, 2011)

**Table 1**  
*Psychological Barriers to Climate Change Mitigation and Adaptation*

| General psychological barrier | Specific manifestation   |                  |   |
|-------------------------------|--|------------------|---|
| Limited cognition             | Ancient brain<br>Ignorance<br>Environmental numbness<br>Uncertainty<br>Judgmental discounting<br>Optimism bias<br>Perceived behavioral control/<br>self-efficacy | Sunk costs       | Financial investments<br>Behavioral momentum<br>Conflicting values, goals, and<br>aspirations |
| Ideologies                    | Worldviews<br>Suprahuman powers<br>Technosalvation<br>System justification   | Discredence      | Mistrust<br>Perceived program<br>inadequacy<br>Denial<br>Reactance                            |
| Comparisons with others       | Social comparison<br>Social norms and networks<br>Perceived inequity   | Perceived risks  | Functional<br>Physical<br>Financial<br>Social<br>Psychological<br>Temporal                    |
|                               |  | Limited behavior | Tokenism<br>Rebound effect  |

## 2. Behavioural concepts explaining behaviour

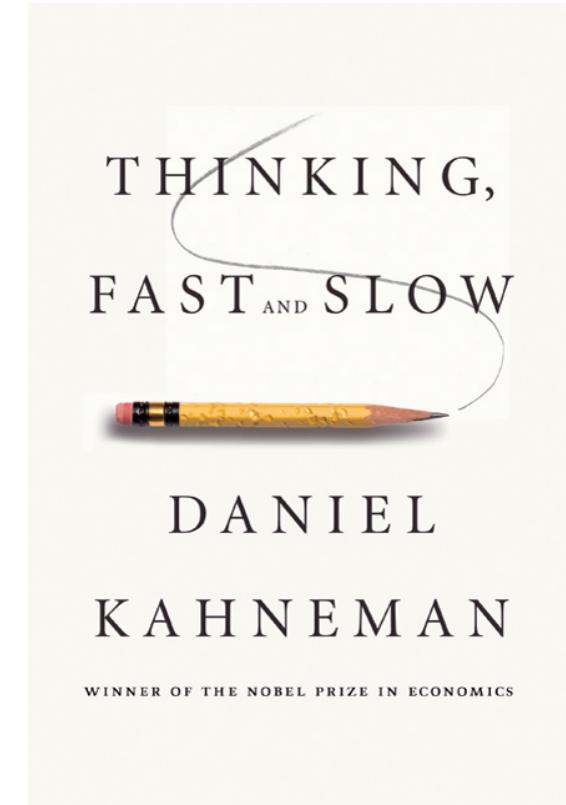
# Behavioural concepts explaining behaviour

1. S1 vs S2
2. Hyperbolic discounting and present bias
3. Inertia & procrastination
4. Loss aversion
5. Limited attention
6. Ambiguity aversion
7. Optimism bias
8. Self-efficacy
9. Social norms
10. Moral intuitions
11. Risk preferences
12. Habits
13. Ignorance
14. Ideologies
15. Discredence

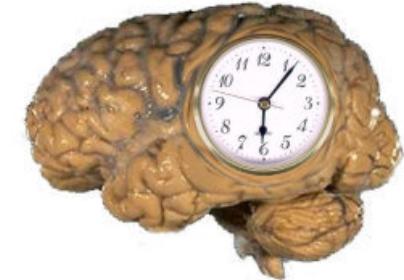
“These dragons are not solitary creatures. They certainly interact. Indeed, their “DNA” undoubtedly is shared in some cases... ” (Gifford, 2011).

# The ancient brain: Two Systems

- The automatic System 1 is evolutionary older. It uses real-world experience as input.
- The reflective System 2 is evolutionary younger. It can deal with abstract thoughts such as climate change.
- System 1 barriers to environmental behaviours might be different than System 2 barriers.



# Hyperbolic discounting



~ Overvaluing present & undervaluing future

- Sacrifices/Costs are in the present.
- Environmental benefits:
  - In the future (large but heavily discounted).
  - Uncertain.
  - Happening somewhere else, i.e. spatial discounting (Gifford et al., 2009).
- E.g. discounting lifetime running cost when buying appliances.

# Inertia and procrastination

- Environmental choices are often not simple, they might include complex trade-offs (e.g. cost now, benefits later).
- People must make an active (burdensome) choice.
- Sometimes this is called an “**effort tax**.”
- When decisions are complex and difficult, people are more likely to stick with the **default**, which is often not green.



# Loss Aversion

~ Losses loom larger than gains (defined relative to a reference point). “If I have it, I won’t give it away”

- Example: Green option: \$200 more upfront but saves \$210 over five years.
  - Gray default: Focus on the immediate loss
  - Green default: Focus on the eventual loss of \$210.

# Ambiguity Aversion

- ~ People dislike ill-defined probabilities (uncertainty), while well-known probabilities (risk) are ok (Ellsberg paradox).
- Perceived or real uncertainty reduces the frequency of pro-environmental behaviour in public good games.
- Individuals tend to interpret any sign of uncertainty as reason to act selfishly.
- Justification for inaction or postponed action
- (True) Phrases such as “likely” or “very likely” might increase uncertainty → Underestimation of risk.

# Insufficient Visceral Reactions to Environmental Risks

- ~ Affect is the wellspring of action (Peters and Slovic, 2000), particularly worry and fear.
- There is no affective response to radon contamination, coastal plains flooding, or climate change.
- Without sufficiently strong visceral reactions to many environmental risks, people cannot be expected to be motivated to take corrective actions spontaneously.

# Optimism Bias

~Belief that one is less at risk than other people.

- Optimism can be beneficial and protective of mental and physical health (Taylor et al., 2000).
- Can lead to lower estimates of environmental risk & hazards posed by climate change (e.g. Weinstein et al., 1988; Pahl et al., 2005)



# Perceived behavioural control & self-efficacy.

- ~ Belief the individual can't do anything about it.
- Belief that the effect of personal actions on the environment is marginal.
- Related is Fatalism: “Nothing can be done anyway.”
- Very consequentialist (neither should we vote).
- Perceived behavioural control can be a strong predictor of travel mode (public vs. private).

# Social Norms

- ~ People compare their actions with others' actions (Festinger, 1954) and derive social norms from others.
- It might be the social norm to waste energy.
- If one is below average, energy use might be increased to fit the norm (Schultz et al., 2007).
- Perceived inequity. “Why should I change if they won’t?”

# Moral Intuitions



- ~ First we automatically “know” what is right/wrong (S1); then we find reasons as to why this is the case (S2).
- Climate change fails to activate moral intuitions  
(Markowitz & Shariff, 2012)
  - It is complex, large-scale, unintentionally caused, and not viewed as a top priority (only 26% in US).
- Requires moral reasoning (in S2), effortful consideration of temporally and spatially distant events to generate a moral imperative; that's tough.

# Moral Licensing

- ~ The tendency to indulge yourself for doing something virtuous (Doing good on Monday so I can do bad on Tuesday)
- **Low-cost hypothesis:** Some behaviours are easier to adopt than others but have little impact.
- Pro-environmental **intent** may not correspond with pro-environmental **impact** (Stern, 2000).
- E.g. Linen shopping bag, but SUV.



# Habits

- Habits are extremely resistant to change.
- Habitual behaviours such as the use of cars and fossil fuel heating are very resistant to permanent change, & change slowly.
- Habits are less strong during life changes.

# Ignorance

- Not being aware of the problem (only few)
- Being aware of the problem (most), but not aware of:
  - Cause of climate change.
  - Extent of climate change.
  - Magnitude of the problem.
  - Specific actions to take.
  - How to carry out these actions.
  - Benefits each action may have.

# Ideologies

- **Capitalistic world view:** Belief in freedom of the commons → devastation of environmental resources.
- **Suprahuman powers:** Deity or Mother Nature. Trust that God will ensure protection.
- **Technosalvation:** Technology will solve problems of climate change, geoengineering (e.g. artificial trees, algae coating buildings)
- **System justification:** Defend & justify the societal status quo.

# Political Ideologies / Party Affiliations

- Conservatives less concerned than liberals about climate change.
- Liberals base moral priorities on harm & fairness, conservatives also focus on in-group loyalty, authority respect, & purity/sanctity (Haidt & Graham, 2007)
- To liberals: Harms to current/future generations
- To conservatives: “Need to belong”

# Discredence

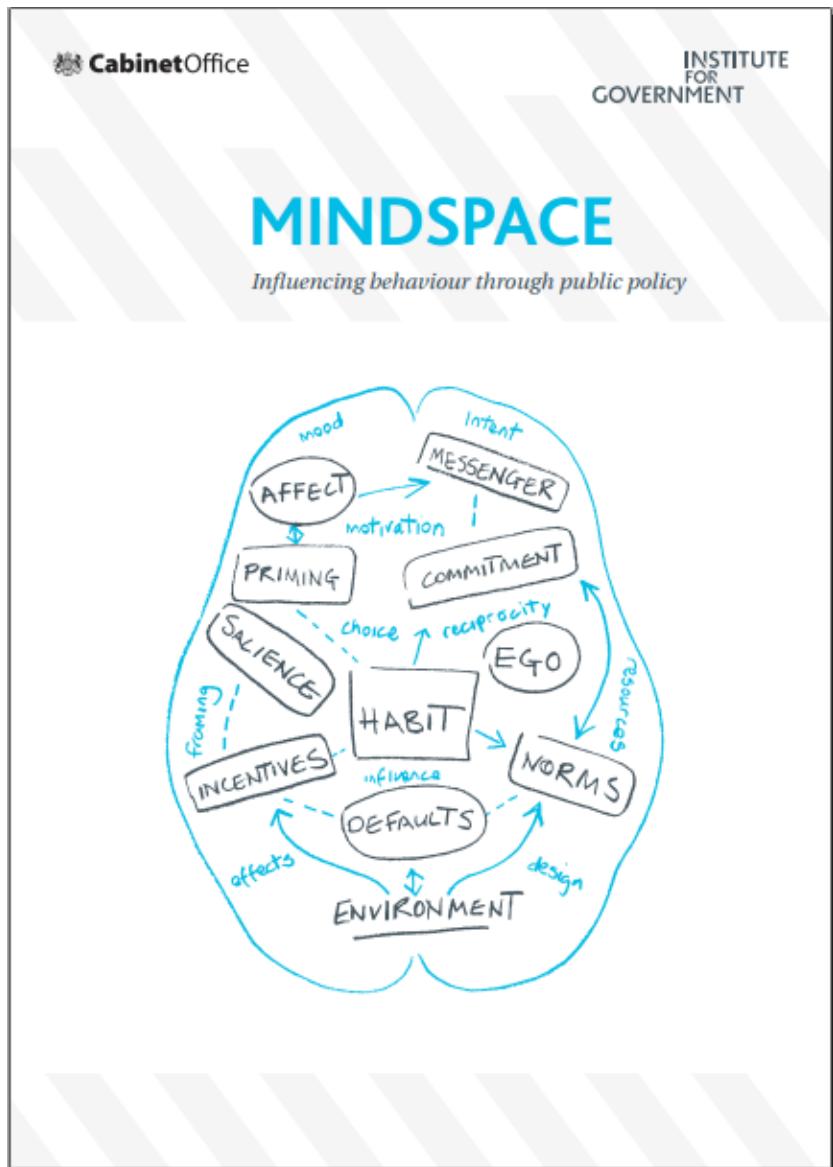
- **Mistrust:** If people do not trust scientists & government, people won't change their behaviour.
- **Perceived program inadequacy:** Belief that program won't help.
- **Denial:** A significant minority view climate change as invented by scientists “pursuing a phantom issue”.
  - Terror management theory suggests that people may deny the problem because it is a reminder of their mortality (Vess & Arndt, 2008).
- **Reactance:** React against scientific advice or policy viewed as threatening freedom:





### 3. Behavioural Policies and the Environment

# MINDSPACE



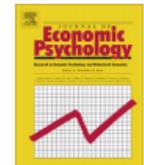
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## Influencing behaviour: The mindscape way

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### ABSTRACT

The ability to influence behaviour is central to many of the key policy challenges in areas such as health, finance and climate change. The usual route to behaviour change in economics and psychology has been to attempt to 'change minds' by influencing the way people think through information and incentives. There is, however, increasing evidence to suggest that 'changing contexts' by influencing the environments within which people act (in largely automatic ways) can have important effects on behaviour. We present a mnemonic, MINDSPACE, which gathers up the nine most robust effects that influence our behaviour in mostly automatic (rather than deliberate) ways. This framework is being used by policymakers as an accessible summary of the academic literature. To motivate further research and academic scrutiny, we provide some evidence of the effects in action and highlight some of the significant gaps in our knowledge.

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# MINDSPACE

|                    |   |
|--------------------|---|
| <b>Messenger</b>   | we are heavily influenced by who communicates information   |
| <b>Incentives</b>  | our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses |
| <b>Norms</b>       | we are strongly influenced by what others do  |
| <b>Defaults</b>    | we 'go with the flow' of pre-set options  |
| <b>Salience</b>    | our attention is drawn to what is novel and seems relevant to us  |
| <b>Priming</b>     | our acts are often influenced by sub-conscious cues   |
| <b>Affect</b>      | our emotional associations can powerfully shape our actions   |
| <b>Commitments</b> | we seek to be consistent with our public promises, and reciprocate acts                                 |
| <b>Ego</b>         | we act in ways that make us feel better about ourselves   |

# Behavioural policies to change behaviour

- 1. Feedback
- 2. Social Comparisons
- 3. Defaults
- 4. Framing
- 5. Social Norms
- 6. Feedback
- 7. Expand group identity
- 8. Make moral values salient
- 9. Attract attention
- 10. Make it intuitive
- 11. Green to be seen & conspicuous conservation
- 12. Moral licensing
- 13. The Rebound Effect

# Feedback: Smart Meters

- Smart grids allow consumers to see their electricity use in real time.
- EU aim: By 2020, smart grids in 80% of households.



# Feedback + Social comparisons

- Opower's Home Energy Reporting Program

**Last Month Neighbour Comparison** | You used **14% MORE** than your efficient neighbours.



**HOW YOU'RE DOING:**



\* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

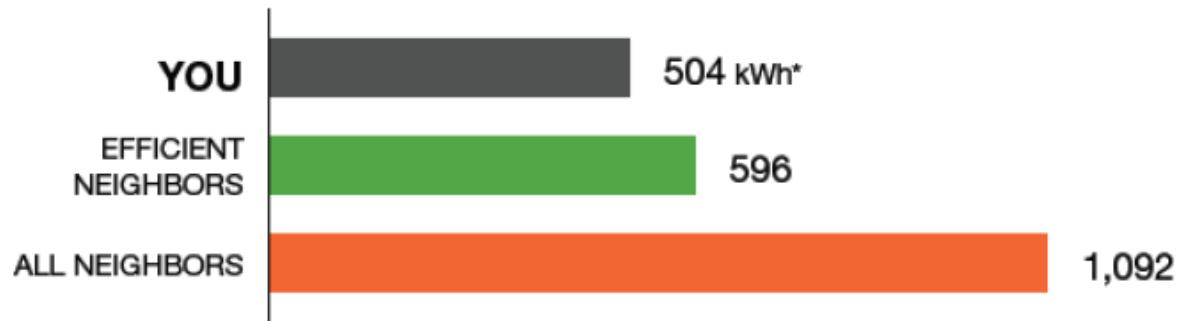
- 2-3% reductions in use are possible.
- Descriptive norm: How you are doing compared to others

# Feedback + Social comparisons

- Injunctive norm: Smiley (to omit boomerang effect)

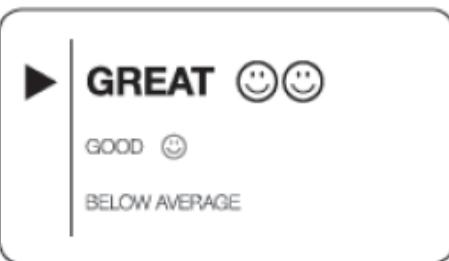
## Last Month Neighborhood Comparison

Last month you used **15% LESS** electricity than your efficient neighbors.



\* kWh: A 100-Watt bulb burning for 10 hours uses 1 kilowatt-hour.

YOUR EFFICIENCY STANDING:



Action Steps | Personalized tips chosen for you based on your energy use and housing profile

### Quick Fixes

Things you can do right now

**Adjust the display on your TV**

New televisions are originally configured to look best on the showroom floor—at a setting that's generally unnecessary for your home.

Changing your TV's display settings can reduce its power use by up to 50% without compromising picture quality. Use the "display" or "picture" menus on your TV; adjusting the "contrast" and "brightness" settings have the most impact on energy use.

Dimming the display can also extend the life of your television.

### Smart Purchases

Save a lot by spending a little

**Install occupancy sensors**

Have trouble remembering to turn the lights off? Occupancy sensors automatically switch them off once you leave a room—saving you worry and money.

Sensors are ideal for rooms people enter and leave frequently (such as a family room) and also areas where a light would not be seen (such as a storage area).

Wall-mounted models replace standard light switches and they are available at most hardware stores.

### Great Investments

Big ideas for big savings

**Save money with a new clothes washer**

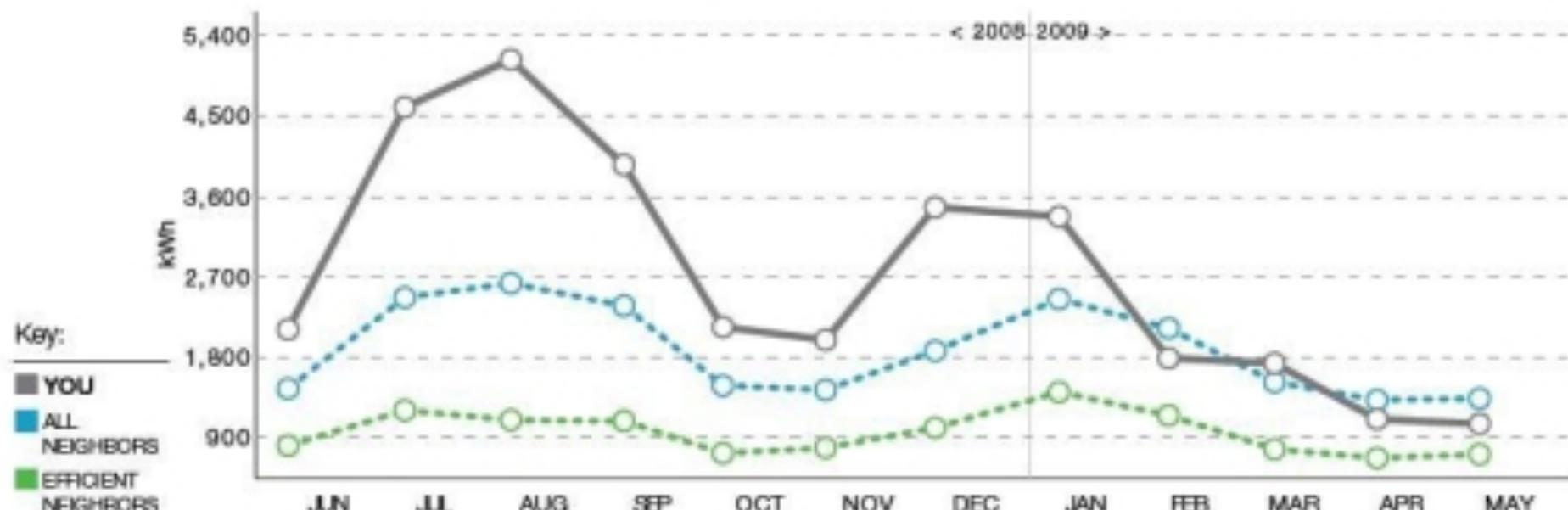
Washing your clothes in a machine uses significant energy, especially if you use warm or hot water cycles.

In fact, when using warm or hot cycles, up to 90% of the total energy used for washing clothes goes towards water heating.

Some premium-efficiency clothes washers use about half the water of older models, which means you save money. SMUD offers a rebate on certain washers—visit our website for more details.

## Last 12 Months Neighbor Comparison

You used 45% **more** electricity than your neighbors.  
This costs you about \$1,029 extra per year.



### Personalized Action Steps

- Set your thermostat for comfort and savings
- Choose efficient light bulbs
- Look for the ENERGY STAR® label

TURN OVER TO LEARN MORE ➔

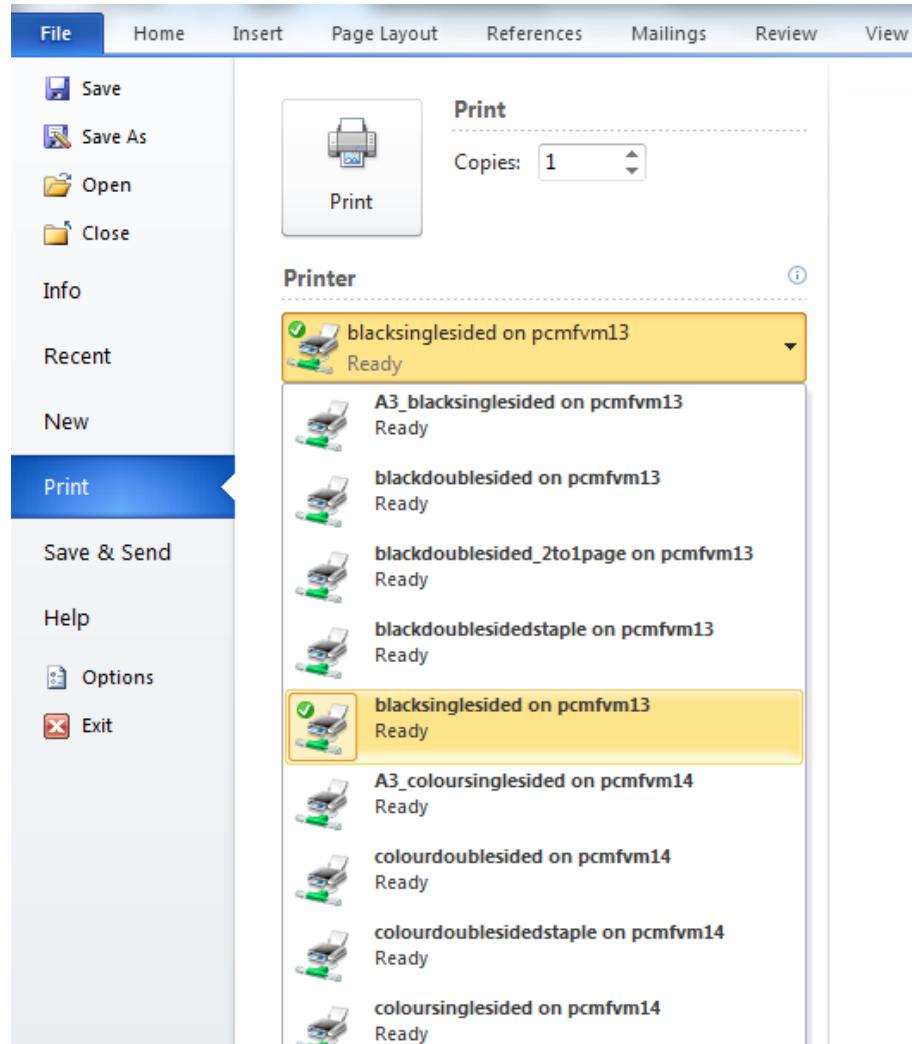
# Green Defaults

- ~ Defaults establish what happens if people do nothing.
- See Sunstein & Reisch (2014) “Automatically Green”
- Powerful, cheap, unavoidable, maintain freedom of choice, don’t change behaviour when preferences are “strong”

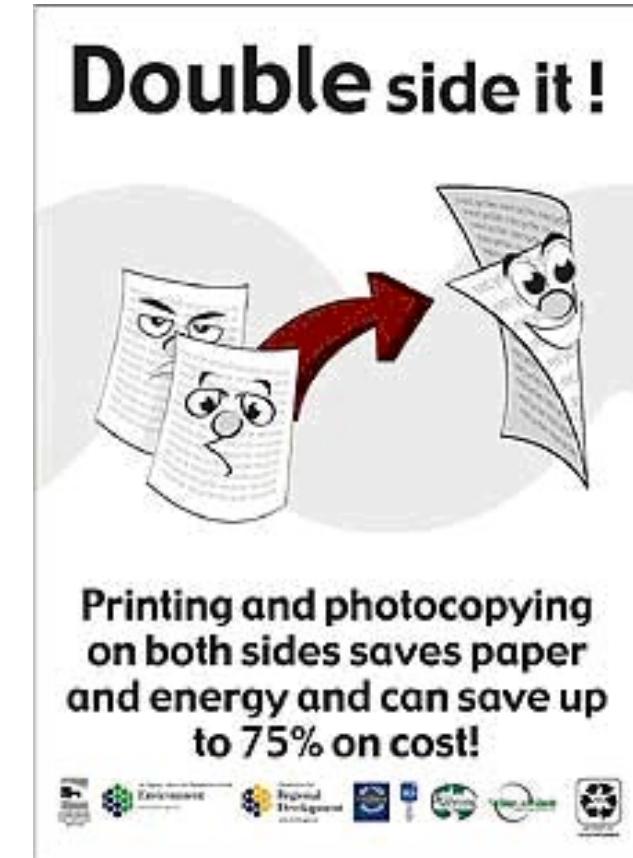
# Green Default + Framing: Smart Meters

- Reluctance to accept smart meters in home.
- Framing of the question:
  - “Do you want to install a smart meter?”
  - “No, I would not like to have a smart meter with remote control installed in my home”
- The acceptance rate is higher if offered as an “optout” frame.
- → “Campaigners therefore should choose a framing only after careful consideration.”

# Green Default: Printing



VS



# Green Default: Printing

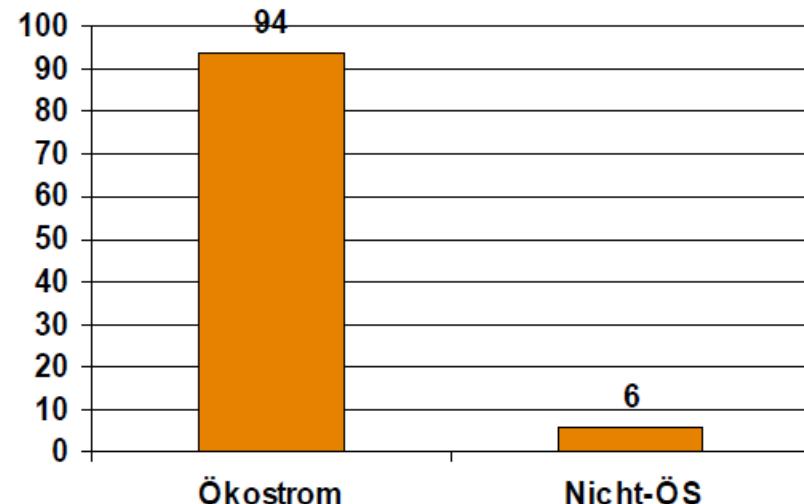
- “Print on front and back” as default (Sunstein & Reisch)
  - At Rutgers University: 44% reduction of sheets printed.
  - Swedish University: 15% drop in paper consumption.
- Saving trees by default ([inudgeyou.com](http://inudgeyou.com))
  - Digitalise education (e.g. Assignments)

# Green Default: Green Energy

- Most households remain in the basic tariff of the energy provider, even though the basic tariff is more expensive



Umstellung des Default



Energiedienst GmbH

by Georg Liebig

# Green Default: Thermostat

- OECD:
    - Minus 1C → reduction in heating costs
    - Minus 2C → much smaller reduction in costs
- (Sunstein & Reisch, 2014)



# Old Energy Performance Certificate

## Energy Performance Certificate

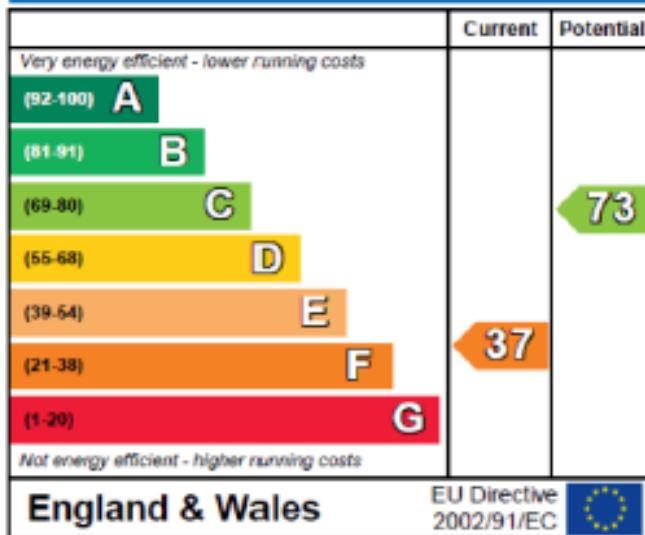


17 Any Street,  
Any Town,  
County,  
YY3 5XX

Dwelling type: Detached house  
Date of assessment: 02 February 2007  
Date of certificate: [dd mmmm yyyy]  
Reference number: 0000-0000-0000-0000-0000  
Total floor area: 166 m<sup>2</sup>

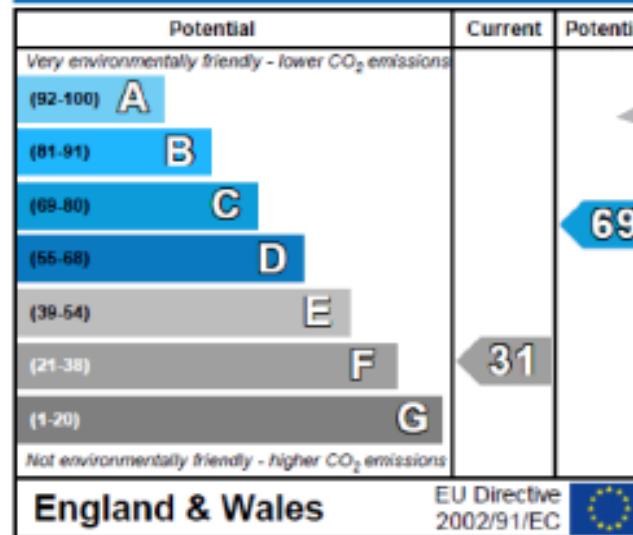
This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO<sub>2</sub>) emissions.

### Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills will be.

### Environmental Impact (CO<sub>2</sub>) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

Estimated energy use, carbon dioxide (CO<sub>2</sub>) emissions and fuel costs of this home

We will be removing this second graph from the front page of the EPC, as it had the potential to confuse consumers

# New: Clear communication of savings

## Energy Performance Certificate



© Crown copyright 2009

17 Any Street  
District  
Any Town  
YY3 5XX

Dwelling type: Detached house  
Date of assessment: 03 October 2012  
Date of certificate: 22 October 2012

Reference number: 0182-2077-9473-0601-9571  
Type of assessment: RdSAP, existing dwelling  
Total floor area: 165 m<sup>2</sup>

**Use this document to:**

- Compare current ratings of properties to see which properties are more energy efficient
- Find out how you can save energy and money by installing basic measures

| Estimated energy bills for 3 years | £5,436 |
|------------------------------------|--------|
| Over 3 years you could save        | £2,715 |

The savings of having an energy-efficient home will be made clearer

**Estimated fuel costs of this home**

|               | Current costs       | Potential costs     | Potential future savings   |
|---------------|---------------------|---------------------|--|
| Lighting      | £243 over 3 years   | £243 over 3 years   |  |
| Heating       | £4,476 over 3 years | £2,166 over 3 years |  |
| Hot water     | £717 over 3 years   | £312 over 3 years   |  |
| <b>Totals</b> | <b>£5,436</b>       | <b>£2,721</b>       |  You could save £2,715 over 3 years |

These figures are estimates and are based on the standard energy bills that are the same for all homes. Energy bills include the costs of heating the home, heating water, and lighting and exclude costs of running appliances like TVs and cookers.

### Energy Efficiency Rating

| Very energy efficient - lower running costs | Current | Potential |
|---|---------|-----------|
| [92 plus] A                                 |         |           |
| [81-91] B                                   |         |           |
| [40-80] C                                   |         |           |

This graph shows the current energy efficiency of your home.

# Conclusion

1. Behaviour matters
2. We know many psychological barriers.
3. We have some idea how to encourage eco-friendly behaviour, but we need to find more behavioural and non-behavioural ways to promote sustainable behaviour.

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